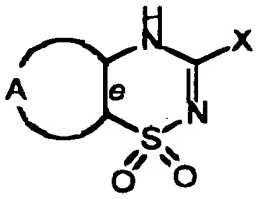
CLAIM AMENDMENTS

1. (amended) A process for the preparation of a compound of formula (I)



(I)

wherein

X is NR^2R^3, SR^1, $S(=O)R^1$, $S(=O)_2R^1$ or OR^1;

R^1 is hydrogen; C_{3-6}-cycloalkyl or (C_{3-6}-cycloalkyl)C_{1-6}-alkyl, wherein the C_{3-6}-cycloalkyl group is optionally mono- or polysubstituted with C_{1-6}-alkyl, halogen, hydroxy or C_{1-6}-alkoxy; a 3-6 membered saturated ring system comprising one or more nitrogen-, oxygen- or sulfur atoms, optionally being mono- or polysubstituted with halogen, cyano, trifluoromethyl, C_{1-6}-alkyl, C_{1-6}-alkoxy, C_{1-6}-alkoxy-C_{1-6}-alkyl, aryl, arylalkyl, hydroxy, oxo, nitro, amino, C_{1-6}-monoalkyl or dialkylamino; straight or branched C_{1-18}-alkyl, C_{2-18}-alkenyl or C_{2-18}-alkynyl, wherein each of the groups is optionally mono- or polysubstituted with halogen, hydroxy, C_{1-6}-alkoxy, C_{1-6}-alkylthio, C_{3-6}-cycloalkyl, nitro, amino, C_{1-6}- monoalkyl- or dialkylamino, cyano, oxo, formyl, acyl, carboxy, C_{1-6}-alkoxycarbonyl, carbamoyl, formylamino, C_{1-6}-alkylcarbonylamino, aryl, aryloxy, arylalkoxy; or bicycloalkyl, aryl, heteroaryl, arylalkyl or heteroarylalkyl, wherein each of the groups is optionally mono- or polysubstituted with halogen, hydroxy, C_{1-6}-alkyl, C_{1-6}-alkoxy, aryloxy, arylalkoxy, nitro, amino, C_{1-6}-monoalkyl- or dialkylamino, cyano, oxo, acyl or C_{1-6}-alkoxycarbonyl;

R^2 is hydrogen; hydroxy; C_{1-6}-alkoxy; or C_{1-6}-alkyl, C_{3-6}-cycloalkyl, C_{2-6}- alkenyl or C_{2-6}-alkynyl optionally mono- or polysubstituted with halogen;

R^3 is hydrogen; C_{3-6}-cycloalkyl or (C_{3-6}-cycloalkyl)C_{1-6}-alkyl, wherein the C_{3-6}-cycloalkyl group is optionally mono- or polysubstituted with C_{1-6}-alkyl, halogen, hydroxy or C_{1-6}-alkoxy; a 3-6 membered saturated ring system comprising one or more nitrogen-, oxygen- or sulfur atoms; or straight or branched C_{1-18}-alkyl optionally mono- or polysubstituted with halogen, hydroxy, C_{1-6}-alkoxy, C_{1-6}-alkylthio, C_{3-6}-cycloalkyl, aryl, aryloxy, arylalkoxy, nitro, amino, C_{1-6}- monoalkyl- or dialkylamino, cyano, oxo, formyl, acyl, carboxy, C_{1-6}-alkoxycarbonyl, or carbamoyl; or

A1

R^3 is $-OR^4$; $-C(=Z)R^4$; $-NR^4R^5$; or bicycloalkyl, aryl, heteroaryl, arylalkyl or heteroarylalkyl, optionally mono- or polysubstituted with halogen, hydroxy, C_{1-6}-alkyl, C_{1-6}-alkoxy, aryloxy, arylalkoxy, nitro, amino, C_{1-6}-monoalkyl- or dialkylamino, cyano, oxo, acyl or C_{1-6}-alkoxycarbonyl;

R^4 is hydrogen; C_{3-6}-cycloalkyl or (C_{3-6}-cycloalkyl)C_{1-6}-alkyl, wherein the C_{3-6}-cycloalkyl group is optionally mono- or polysubstituted with C_{1-6}-alkyl, halogen, hydroxy or C_{1-6}-alkoxy; a 3-6 membered saturated ring system comprising one or more nitrogen-, oxygen- or sulfur atoms; or straight or branched C_{1-18}-alkyl optionally mono- or polysubstituted with halogen, hydroxy, C_{1-6}-alkoxy, C_{1-6}-alkylthio, C_{3-6}-cycloalkyl, aryl, aryloxy, arylalkoxy, nitro, amino, C_{1-6}- monoalkyl- or dialkylamino, cyano, oxo, formyl, acyl, carboxy, C_{1-6}-alkoxycarbonyl, or carbamoyl;

Z is O or S;

R^5 is hydrogen; C_{1-6}-alkyl; C_{2-6}-alkenyl; C_{3-6}-cycloalkyl optionally mono- or polysubstituted with C_{1-6}-alkyl, halogen, hydroxy or C_{1-6}-alkoxy; or

when R^3 is $-NR^4R^5$, R^4 and R^5 together with the nitrogen atom form a 3-12 membered mono- or bicyclic system, in which one or more of the carbon atoms may be exchanged with nitrogen, oxygen or sulfur, each of these ring systems optionally being mono- or polysubstituted with halogen, C_{1-6}-alkyl, hydroxy, C_{1-6}-alkoxy, C_{1-6}-alkoxy-C_{1-6}-alkyl, nitro, amino, cyano, trifluoromethyl, C_{1-6}-monoalkyl- or dialkylamino, or oxo; or

when X is $-NR^2R^3$, R^2 and R^3 together with the nitrogen atom form a 3-12 membered mono- or bicyclic system, in which one or more of the carbon atoms may be exchanged with nitrogen, oxygen or sulfur, each of these ring systems optionally being mono- or polysubstituted with halogen, C_{1-6}-alkyl, hydroxy, C_{1-6}-alkoxy, C_{1-6}-alkoxy-C_{1-6}-alkyl, nitro, amino, cyano, trifluoromethyl, C_{1-6}-monoalkyl- or dialkylamino or oxo;

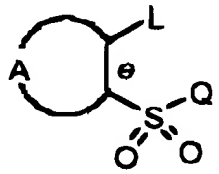
A'

A together with the carbon atoms forming bond *e* of formula I represents a 5 membered heterocyclic system comprising one or more nitrogen-, oxygen- or sulfur atoms, the heterocyclic system optionally being mono- or polysubstituted with halogen; C_{1-18}-alkyl; C_{3-6}-cycloalkyl; hydroxy; C_{1-6}-alkoxy; C_{1-6}-alkoxy-C_{1-6}-alkyl; nitro; amino; cyano; cyanomethyl; perhalomethyl; C_{1-6}-monoalkyl- or dialkylamino; sulfamoyl; C_{1-6}-alkylthio; C_{1-6}-alkylsulfonyl; C_{1-6}-alkylsulfinyl; C_{1-6}-alkylcarbonylamino; arylthio, arylsulfinyl, arylsulfonyl, aryl, arylalkyl, or aryloxy, wherein the aryl group is optionally mono- or polysubstituted with C_{1-6}-alkyl, perhalomethyl, halogen, hydroxy or C_{1-6}-alkoxy; C_{1-6}-alkoxycarbonyl; C_{1-6}-alkoxycarbonyl-C_{1-6}-alkyl; carbamyl; carbamylmethyl; C_{1-6}-monoalkyl- or dialkylaminocarbonyl; C_{1-6}-monoalkyl- or dialkylaminothiocarbonyl; ureido; C_{1-6}-monoalkyl- or dialkylaminocarbonylamino; thiocarbamyl; thioureido; C_{1-6}-monoalkyl- or dialkylaminothiocarbonyl- amino; C_{1-6}-monoalkyl- or dialkylaminosulfonyl; carboxy; carboxy-C_{1-6}-alkyl; acyl; formyl; or a 5 - 6 membered nitrogen, oxygen or sulfur containing ring, optionally substituted with C_{1-6}-alkyl or phenyl, wherein the phenyl group is optionally mono- or polysubstituted with C_{1-6}-alkyl, perhalomethyl, halogen, hydroxy or C_{1-6}-alkoxy; or

a salt thereof with a pharmaceutically acceptable acid or base, or an optical isomer thereof, or a tautomeric form thereof~~, or metabolites or prodrugs thereof,~~

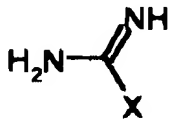
comprising one of the following methods:

a) reacting a compound of formula (II)



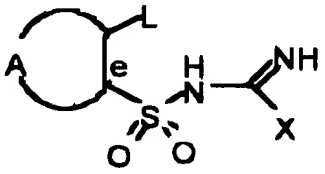
(II)

wherein A is as defined above, L is a leaving group selected from alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl, nitro or halogen and Q is halogen, with a compound of formula (III),



(III)

wherein X is NR^2R^3, wherein R^2 and R^3 are defined above, or a suitable salt thereof, in the presence of a base in solvent 1, to form a compound of formula (IV)

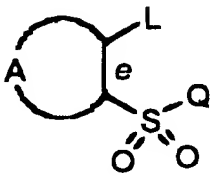


(IV)

wherein A, L and X are as defined above, and

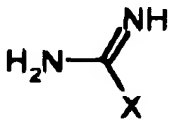
cyclizing the compound of formula (IV) in solvent 2, optionally in the presence of a base, and optionally with a metal catalyst, to form a compound of formula (I), or

b) reacting a compound of formula (II)



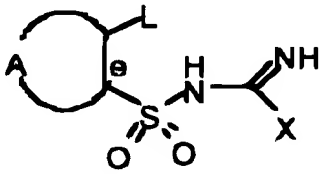
(II)

A1 wherein A is as defined above, L is a leaving group selected from alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl or halogen and Q is halogen, with a compound of formula (III),



(III)

wherein X is SR^1, $S(=O)R^1$ or $S(=O)_2R^1$, wherein R^1 is defined above, or a suitable salt thereof, in the presence of a base in solvent 1, to form a compound of formula (IV)

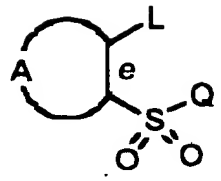


(IV)

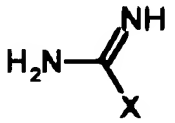
wherein A, L and X are as defined above, and

cyclizing the compound of formula (IV) in solvent 2, optionally in the presence of a base, and optionally with a metal catalyst, to form a compound of formula (I), or

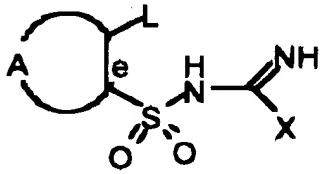
c) reacting a compound of formula (II)


(II)

wherein A is as defined above, L is a leaving group selected from alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl or halogen and Q is halogen, with a compound of formula (III),


(III)

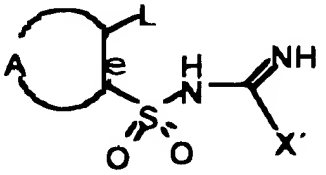
wherein X is OR^1, wherein R^1 is defined above, or a suitable salt thereof, in the presence of a base in solvent 1, to form a compound of formula (IV)


(IV)

wherein A, L and X are as defined above, and

cyclizing the compound of formula (IV) in solvent 2, optionally in the presence of a base, and optionally with a metal catalyst, to form a compound of formula (I), or

d) transforming a compound of formula (IV) in c) to a compound of formula (IV')


(IV')

wherein A, L and X are as defined ~~above~~in c), and X of (IV) is transformed into X', wherein X' is selected from the groups defined for X, with the proviso that X' ≠ X, and

cyclizing the compound of formula (IV′) in solvent 2, optionally in the presence of a base, and optionally with a metal catalyst, to form a compound of formula (I~~), or~~

~~e) transforming a compound of formula (I), prepared as described above, by oxidation or substitution or both, to form another compound of formula (I).~~

2. (original) A process according to claim 1 comprising:

reacting a compound of formula (II)

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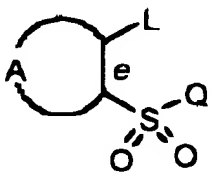
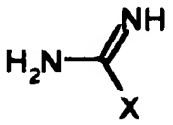


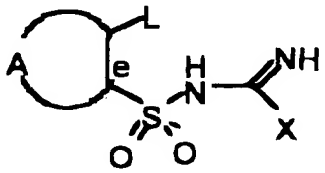
(II)

wherein A is as defined above, L is a leaving group selected from alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl, nitro or halogen and Q is halogen, with a compound of formula (III)



(III)

wherein X is NR^2R^3, wherein R^2 and R^3 are defined above, or a suitable salt thereof, in the presence of a base in solvent 1, to form a compound of formula (IV)



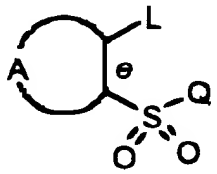
(IV)

wherein A, L and X are as defined above, and

cyclizing the compound of formula (IV) in solvent 2, optionally in the presence of a base, and optionally by treatment with a metal catalyst, to form a compound of formula (I).

3. (original) A process according to claim 1 comprising:

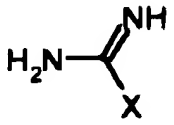
reacting a compound of formula (II)



(II)

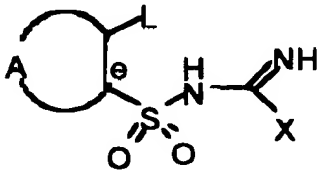
A1

wherein A is as defined above, L is a leaving group selected from alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl, nitro or halogen and Q is halogen, with a compound of formula (III),



(III)

wherein X is SR^1, $S(=O)R^1$ or $S(=O)_2R^1$, wherein R^1 is defined above, or a suitable salt thereof, in the presence of a base in solvent 1, to form a compound of formula (IV)



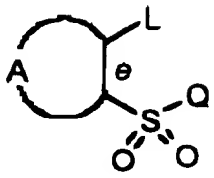
(IV)

wherein A, L and X are as defined above, and

cyclizing the compound of formula (IV) in solvent 2, optionally in the presence of a base and, optionally by treatment with a metal catalyst, to form a compound of formula (I).

4. (original) A process according to claim 1 comprising:

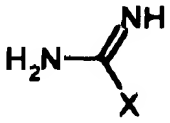
reacting a compound of formula (II)



(II)

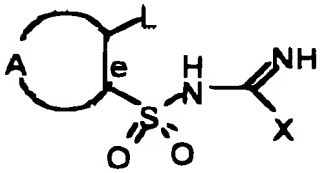
A1

wherein A is as defined above, L is a leaving group selected from alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl, nitro or halogen and Q is halogen, with a compound of formula (III),



(III)

wherein X is OR^1, wherein R^1 is defined above, or a suitable salt thereof, in the presence of a base in solvent 1, to form a compound of formula (IV)



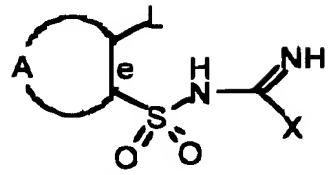
(IV)

wherein A, L and X are as defined above, and

cyclizing the compound of formula (IV) in solvent 2, optionally in the presence of a base and, optionally by treatment with a metal catalyst, to form a compound of formula (I).

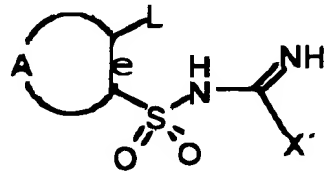
5. (amended) A process according to claim 1 comprising:

transforming a compound of formula (IV)



(IV)

into a compound of formula (IV')



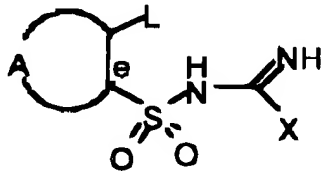
(IV')

~~wherein A, L and X are as defined above, and~~ wherein X is transformed into X', wherein X' is selected from the groups defined for X, with the proviso that X' ≠ X, and

cyclizing the compound of formula (IV') in solvent 2, optionally in the presence of a base and, optionally by treatment with a metal catalyst, to form a compound of formula (I).

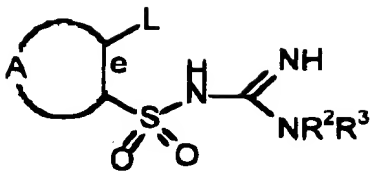
6. (original) A process according to claim 1 comprising:

transforming a compound of formula (IV)



(IV)

wherein A, and L are as defined above and X is SR^1, $S(=O)R^1$ or $S(=O)_2R^1$, wherein R^1 is defined above, into a compound of formula (V)



(V)

wherein A, L and R^2 and R^3 are as defined above, and

cyclizing the compound of formula (V) in solvent 2, optionally in the presence of a base and, optionally by treatment with a metal catalyst, to form a compound of formula (I).

7. (original) A process according to claim 1, wherein the process further comprises cyclizing the compound of formula (IV) in solvent 2 in the presence of a base.

A1

8. (original) A process according to claim 1, wherein the process further comprises cyclizing the compound of formula (IV) in solvent 2 in the presence of a base and by treatment with a metal catalyst.

9. (original) A process according to claim 1, wherein the process further comprises cyclizing the compound of formula (IV) in solvent 2 in the presence of a base and without a metal catalyst.

10. (original) A process according claim 1, wherein the process further comprises cyclizing the compound of formula (IV) in solvent 2 without the presence of a base.

11. (original) A process according to claim 1, wherein the process further comprises cyclizing the compound of formula (IV) in solvent 2 by treatment with a metal catalyst without the presence of a base.

12. (original) A process according to claim 1, wherein the process further comprises cyclizing the compound of formula (IV) in solvent 2 without the presence of a base and without a metal catalyst.

Claim 13 is cancelled.

14. (original) A process according to claim 1, wherein the base is selected from sodium hydroxide, potassium carbonate, cesium carbonate or potassium hydroxide.

15. (original) A process according to claim 1, wherein solvent 1 is selected from diethyl ether, acetone, toluene or t-butyl-methyl ether.

A1

16. (original) A process according to claim 1, wherein solvent 2 is selected from *N,N*-dimethylformamide, toluene, xylene,1-butanol, N-methyl-2-pyrrolidinone, sulfolane, dimethylsulfoxide, DMPU or water.

17. (original) A process according to claim 1, wherein the metal catalyst is selected from copper bronze, copper oxide, copper chloride, copper bromide or copper iodide.

18. (amended)) A compound selected from the group consisting of:
3-Amino-6-chloro-4H-thieno[3,2-e]-1,2,4-thiadiazine 1,1-dioxide;
7-Bromo-6-chloro-3-propylaminothieno[2,3-e]-1,2,4-thiadiazine 1,1-dioxide;
7-Bromo-3-(*sec*-butylamino)-6-chloro-4H-thieno[2,3-e]-1,2,4-thiadiazine 1,1-dioxide;
7-Bromo-6-chloro-3-cyclobutylamino-4H-thieno[2,3-e]-1,2,4-thiadiazine 1,1-dioxide;
6-Chloro-3-methylsulfanyl-4H-thieno[2,3-e]-1,2,4-thiadiazine 1,1-dioxide; or
6-Chloro-3-methylsulfinyl-4H-thieno[2,3-e]-1,2,4-thiadiazine 1,1-dioxide
~~obtained by a process according to claim 1~~.

19. (amended) A compound selected from the group consisting of:
6-Bromo-3-methylsulfanyl-4H-thieno[2,3-e]-1,2,4-thiadiazine 1,1-dioxide;6-Bromo-3-methylsulfinyl-4H-thieno[2,3-e]-1,2,4-thiadiazine 1,1-dioxide;3-Amino-6-bromo-4H-thieno[3,2-e]-1,2,4-thiadiazine 1,1-dioxide;6-Chloro-3-ethylamino-4H-thieno[2,3-e]-1,2,4-thiadiazine 1,1-dioxide;

6-Chloro-3-propylamino-4H-thieno[2,3-e]-1,2,4-thiadiazine 1,1-dioxide;
3-Isopropylamino-6-methyl-4H-thieno[3,2-e]-1,2,4-thiadiazine 1,1-dioxide;
6-Methyl-3-propylamino-4H-thieno[3,2-e]-1,2,4-thiadiazine 1,1-dioxide; or
3-*sec*-Butylamino-6-methyl-4H-thieno[3,2-e]-1,2,4-thiadiazine 1,1-dioxide
~~obtained by a process according to claim 1~~.

20. (original) A pharmaceutical composition for the treatment or prophylaxis of Type I or Type II diabetes comprising a compound according to claim 18 and a pharmaceutically acceptable carrier.

A'

21. (original) A pharmaceutical composition for the treatment or prophylaxis of Type I or Type II diabetes comprising a compound according to claim 19 and a pharmaceutically acceptable carrier.

22. (original) A method of treating Type I or Type II diabetes which comprises administering an effective or prophylactic amount of a compound according to claim 18 to a person suffering from Type I or Type II diabetes.

23. (original) A method of treating Type I or Type II diabetes which comprises administering an effective or prophylactic amount of a compound according to claim 19 to a person suffering from Type I or Type II diabetes.